CLAIMS

What is claimed is:

1. A patch antenna comprising:

a counterpoise;

a radiator having a first end and a second end;

a first dielectric interposed between the second end of the radiator and the counterpoise; and

a first capacitor formed from a dielectric with ferroelectric material, having a variable dielectric constant, interposed between the radiator second end and the counterpoise, wherein the antenna is resonant at a frequency responsive to the dielectric constant of the first capacitor ferroelectric material.

2. The antenna of claim 1 further comprising a radio frequency (RF) antenna interface for connecting the radiator to a transmission line first polarity and connecting the counterpoise to the transmission line second polarity, the interface having a predetermined fixed characteristic impedance independent of the resonant frequency.

3. The antenna of claim 1 wherein the antenna has a predetermined approximately constant gain independent of the resonant frequency.

4. The antenna of claim 1 wherein the first capacitor includes:

a dielectric formed from a material with a fixed dielectric constant; and

a dielectric formed from a ferroelectric material with a variable dielectric constant,

wherein the antenna has a resonant frequency responsive to the variable dielectric constant of the ferroelectric material.

5. The antenna of claim 1 further comprising a bias voltage feed for applying a voltage to the first capacitor, wherein the first capacitor ferroelectric dielectric has a dielectric constant that varies in response to the applied voltage.

6. The antenna of claim 5 wherein the first capacitor has a first terminal connected to the bias voltage feed and a second terminal connected to the counterpoise; and, wherein the bias voltage feed applies a first voltage potential across the first capacitor.

7. The antenna of claim 6 wherein the first capacitor includes:

at least one fixed constant dielectric layer; and

a ferroelectric dielectric with a variable dielectric constant, adjacent the fixed constant dielectric.

8. The antenna of claim 6 further comprising a bias voltage blocking capacitor interposed between the second end of the radiator and the first terminal of the first capacitor, the second end of the radiator being connected to the counterpoise.

9. The antenna of claim 8 wherein the blocking capacitor is formed from a dielectric with ferroelectric material.

10. The antenna of claim 6 further comprising a bias voltage blocking capacitor interposed between the first end of the radiator and the counterpoise.

11. The antenna of claim 10 wherein the blocking capacitor is formed from a dielectric with ferroelectric material.

12. The antenna of claim 10 wherein the bias voltage feed is supplied to a transmission line first polarity connected to the radiator.

13. The antenna of claim 5 wherein the first capacitor is a gap capacitor having the first and second terminals formed as pads, separated by a gap, overlying a layer of ferroelectric dielectric.

14. The antenna of claim 13 wherein the first capacitor includes the layer of ferroelectric dielectric overlying a layer of fixed constant dielectric.

15. The antenna of claim 5 wherein the first capacitor is a parallel plate capacitor having the first terminal formed as a plate, overlying a layer of ferroelectric dielectric, overlying a layer of fixed constant dielectric, overlying the second terminal formed as a plate.

16. The antenna of claim 8 further comprising a third capacitor formed from a dielectric with ferroelectric material, having a variable dielectric constant, interposed between a transmission line first polarity and the radiator; and, wherein the characteristic impedance of the transmission line is responsive to the dielectric constant of the third capacitor ferroelectric material.

17. The antenna of claim 10 further comprising a third capacitor formed from a dielectric with ferroelectric material, having a variable dielectric constant, interposed between a transmission line first polarity and the radiator; and, wherein the characteristic impedance of the transmission line is responsive to the dielectric constant of the third capacitor ferroelectric material.

18. The antenna of claim 1 wherein the combination of the first capacitor and the radiator have an effective electrical wavelength of a quarter-wavelength of the resonant frequency.

19. The antenna of claim 1 wherein the first capacitor includes a dielectric formed exclusively from a ferroelectric material with a variable dielectric constant; and, wherein the antenna has a resonant frequency responsive to the variable dielectric constant of the ferroelectric material.